

You can join in public radio's reinvention, on-line

Medium has new capabilities,
but content is still paramount

By Carl Malamud

A few months ago, I started a new kind of radio station, one that uses computer networks and personal computers as the vehicle for sending streams of audio data around the world. This experiment in computer networks was dubbed "Internet Talk Radio" and featured plans for a single show: *Geek of the Week*. This little project soon grew out of control and now I find myself running the world's first cyber station.

Like anybody involved in a technical field such as computer networks, I found much of my time taken up with disseminating and digesting information. I wrote books and articles and read books and articles. I consumed a massive amount of digital data, ranging from electronic mail to bulletin board discussion groups to technical papers stored on-line in digital libraries.

The problem was, the data I was getting was not giving me the kind of information I needed. I wanted a general source of real information about my field and I wasn't getting it. If I wasn't getting what I wanted, it was a safe bet that my colleagues were not getting what they wanted, either.

What the computer field has been missing is a working press. We have lots of great in-depth professional reference works, but the magazines and newsletters for the field are a step below the usual standards for the trade press, combining fair-to-middling journalistic skills with little practical understanding of how to use a computer.

What I wanted was a decent magazine or other source of regular information to keep me up to date in my field. You know: a few technical articles, a few funny stories, a little gossip, some editorials, all mixed together in a way that I could look forward to a dependable, real source of information. In short, the kind of thing you read with your morning coffee or on the train to work.

At first, I thought I'd start my own magazine. Magazines cost money, though. You pay lots to print and mail the magazine, and to verify the circulation for advertisers.

I decided it was time to start using the tools that I've been teaching others how to use. For the last two years, I've been studying the global Internet computer network, a network of networks that reaches 20 million people in 140 countries, a network that is growing at the historically unprecedented rate of 20 percent per month. The Internet is the global village, the web of connectivity that will soon reach every computer in the world.

While there are several on-line newsletters on the Internet, it occurred to me to play with a different kind of data. Two factors made multimedia publication—supplementing text with audio, video and other data types—practical and possible. The Internet infrastructure has expanded to the point where several million people have gone beyond the initial connectivity of a dial-up telephone line and a modem and now have permanent, high-speed connections into the Internet. At the same time, computers have matured to the point where several million people have computers with sufficient storage capacity to hold multimedia data and the hardware to play high-fidelity sound.

With multimedia starting to spread throughout the Internet, it seemed like it shouldn't be too hard to go to a conference of engineers with a microphone and a digital audio tape (DAT) deck and sit down to tape a series of interviews. The idea for *Geek of the Week* was born, and I decided the idea had enough merit to justify spending a few hours a week on it. A sort of hobby, if you will.

The hobby turned into a full-time occupation. I quickly realized that I wanted to have high-quality data: professional programming and professional production. I called a friend who worked his way through law school playing in bands and persuaded him to spend part of his time composing music for me. I invested in digital effects processors, digital interfaces for computers, professional microphones and a variety of other fancy new toys.

Our listeners show us new ways to play the files. One spools the sound into his company voice-mail system, letting his listeners dial up "Geek of the Week" or the Dalai Lama on their speakerphones. Several copy the data onto their Macintosh Powerbooks and play the radio on their drive home.



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Next thing we knew, we had a radio station. *Geek of the Week* was in production and we were negotiating with the National Press Club for permission to rebroadcast their luncheons. Granted, the club was a bit perplexed as to what we were doing, but it sounded kind of futuristic and after all, I was a member of the press. Sort of. A radio station was being born, but nobody quite believed this was real.

Then, for some strange reason, the *New York Times* decided this was front-page material. My phone started ringing and ringing and ringing. The National Press Club decided we were legitimate. *Geek of the Week* was joined by *TechNation*. The initial two underwriters, Sun Microsystems and O'Reilly & Associates, were convinced they had invested wisely and exercised their options for a year's worth of shows.

We soon found ourselves in an office in the National Press Building, ensconced between the Washington bureaus of publications from such exotic locales as Korea and Kansas. Two of our sponsors—MFS Datanet and UUNET Technologies—helped us pull fiber optic into the office and into the National Press Club, establishing a 10-million-bit-per-second link into the Internet, the fastest link in Washington, D.C. The link was so fast, in fact, that the White House borrowed it when they needed to put the Rose Garden on-line for a demonstration for the President.

The basic operation is actually quite simple. We produce shows like any production studio, mixing our own material or transferring other people's shows onto a local master. Our masters use the same format as DAT or CDs: 48 kilohertz sound files, suitable for professional production. Instead of putting our masters on a DAT, however, we keep them on a computer.

These digital files have 48,000 samples per second, with each sample taking 16 bits of data. That means that an hour of audio, mixed down to mono, takes 330 megabytes. Computers are powerful today, but moving around 330 megabyte files is a bit much, even for high-end workstations.

To make the data more manageable, we resample the files down to 8,000 samples per second using a standard known as Pulse Code Modulation (PCM)—about the same quality as a radio station gets when it installs a dedicated, balanced, telephone line for a remote feed. Not exactly ideal for Mahler or Wagner, but fine for most radio work.

We then put the completed program on the Internet. Each program is one or more audio files, accompanied by a "read-me" file of text describing the program (equivalent to the DACS system in public radio). Through our informal distribution mechanism, major networks automatically grab the files from the first distribution point, making copies of the data available at convenient locations around the world. No fancy distribution system (e.g., no lawyers and no contracts) needs to be established: the Internet is remarkable in its ability to dynamically establish distribution trees for important data.

Corporate and campus networks and end users go to the various regional and organizational distribution points and transfer the files onto their local networks. The files are played using the standard sound tools available on any modern Macintosh, NeXT, PC or other computer. We don't distribute any software; our only product is data that can be played as the user sees fit.

We impose no copy restrictions on the data. The strategy is to get the widest possible listenership, then sell the demographics back to the underwriters. Using statistical techniques, we've estimated our listenership at 100,000 people in 30 countries. We can't measure our listenership exactly, but we like to say that our estimates are at least as accurate as the Nielsen ratings for television.

Because there are no copy restrictions and no special software, our listeners end up showing us new ways to play the files. Many networks run local "radio stations," broadcasting the data onto their network and letting users tune in. One network manager spools the sound into his company voice-mail system, letting his listeners dial up *Geek of the Week* or the Dalai Lama on their speakerphones. We've had several radio stations copy our data off the network and put the program back on the air. Several people actually copy the data onto their Macintosh Powerbooks and play the radio on their drive home.

Radio is, at first glance, what we do. We syndicate shows from public broadcasting such as *TechNation*, *Soundprint* and specials such as Pacific Multimedia's classic eight-part *Hell's Bells: A Radio History of the Telephone*. We produce our own *Geek of the Week*. We join NPR and C-SPAN in covering the National Press Club luncheons.

We call this radio, but that's a metaphor for what we're doing. This is a different beast from radio, one in which sound and video and images and text can all coexist easily. This is a medium where you can put the "radio" on pause when a phone call comes in, radio where you can talk back to the set and, the host willing, have your questions sent back out over the air.

I picked radio as a metaphor after looking carefully at the current capabilities of the Internet and after looking carefully at the history of our communications media in the past. We often borrow an older metaphor when we start anew: television started out as radio with pictures, and the telephone started as a telegraph you can hear.

Over time, we adapt to the unique characteristics of the medium we inhabit. The radio station becomes a cyber station and the similarity to radio goes away as we adapt to the realities of a new medium based on a global network of computers.

If public radio ignores the remarkable convergence of media that is occurring, it will relegate itself to history. Actively working with the new technology will be the key. There is a role, but it must be found based on real experience with the technology. You can't do this from the sidelines.

Is there a role for public broadcasting in this world? Yes! There is room for the announcers and the engineers and the producers and the stations. There is definitely room for the networks. But, there is no room for those who program with the past, who insist that they have an immutable format that cannot change. If public radio ignores the remarkable convergence of media that is occurring, it will relegate itself to history. Actively working with the new technology will be the key if public broadcasting is to adapt. There is a role, but that role must be found based on real experience with the technology. You can't do this from the sidelines.

In broadcasting, indeed in any medium, while the distribution media and the data types are defining characteristics, what is paramount is the flow of content. Public radio is not about audio data sent out over a satellite system, public radio is about *All Things Considered* and Terry Gross and *TechNation* and Garrison Keillor.

Public broadcasting has evolved to become a mix of local programming, national feeds from NPR and APB and PBS, and feeds from independent producers using the public broadcasting satellite systems. All of these sources of data are mixed together and sequenced to form what we know as the "station."

What makes NPR and APB and PBS special? What makes your local station special? It is not airwaves or big antennas, it is not spectrum allocation or digital encoding formats. What gives public broadcasting its identity is the organized distribution of information. What do we talk about? How is the information presented? How, over time, do we come to depend on one data stream over another for a certain flavor, a certain feel?

Who you are talking to and what you are saying are what define public broadcasting. The fact that the data on a radio station are all audio and that a satellite system is used are irrelevant in the long run, no more significant than the fact that record players in your station are being replaced by CDs. CDs did not spell the end of radio and neither will computers.

There are many things that a station today can do to ease itself into the global village. First and foremost is to get electronic mail. This can be as simple as

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calling up CompuServe or MCI Mail or the dozens of other commercial providers and getting an account, or it can be a bit more adventurous by signing up with Internet service providers.

Electronic mail is the entry point, it is the line that differentiates those that try from those that don't. If you don't have electronic mail, you can't communicate. Electronic mail can cost less than \$10 per month, the modem costs \$200 or less. There is no excuse not to have electronic mail: tens of millions of people around the world use electronic mail on a daily basis. If you work with information, this is a tool you need to have.

What do you do with your electronic mail? At first, you simply send messages to your colleagues. You would be shocked at how many of your colleagues are already on-line. You can quickly join a world where people actually write to each other on a regular basis.

Next, you sign up for mailing lists. You can join forums that discuss the future of radio or the future of film or the future of Asian cuisine. You can join forums that look at digital libraries or discuss how to use your Macintosh or the merits of Australian rugby.

Electronic mail is not some mere hobby, it can become an integral part of your work in broadcasting. If you are producing a show, include the electronic mail address in the ending credits. You'll be amazed to see how many comments you get back from your listeners: people will dash you off a little bit of e-mail but are much less likely to write you a formal letter.

E-mail can be used as an important tool for the talk show host. When we hooked Ira Flatow's Friday edition of *Talk of the Nation* to the Internet, we got hundreds of

It is not my cyber station versus your radio station; it is us versus "Married with Children."

listeners sending their comments and questions in. When was the last time you had 300 of your listeners write you a letter in one hour?

Getting hundreds of letters doesn't mean that you'll read them all on the air or even respond. It does mean that your listeners have an opportunity to interact with you. They become part of the show. More importantly, you now have the opportunity to choose which questions you want to address on the air. If you have a talk show, your path to the listeners is a telephone line. If you're a traditional talk show, you have a half-dozen or so lines. How many potential questions can you possibly get in an hour over a telephone line? Perhaps a dozen by the time you've screened each call and queued it up.

The worst problem with a telephone line is that you're getting the wrong comments. Think about it. You have only a few lines. Who gets through? The guy with nothing better to do than to continually hit the redial button. Is this the listener you want on the air?

With electronic mail, a single phone line can be used to bring in hundreds of messages. Park an intern on a laptop computer with a modem and you can get a vast number of potential questions. Ask people to include a phone number and call them back if the question looks interesting, or simply read the message on the air.

Once you get on the network, you'll quickly move beyond e-mail. You'll find that you can communicate with an important part of your listener base, particularly if your station is based around a university campus. Almost all students at major universities have access to

the Internet. You can post your schedule on the network. People can pledge on the network. You can run a discussion group around topics that you feature on programs.

What's the next step? Your listenership is currently bounded by the precious spectrum that the government granted you. Your transmitter's reach restricts how many people will listen (and pledge).

What if your station could reach around the world? It really isn't difficult! Publish your programs as audio files on the network and put them on a server. If you feel your station is unique (and who doesn't?), you can send that unique information around the world.

You can use the network to distribute to other stations as well. Tired of upload fees? Can't get satellite time? Miss that last cycle? Use the network instead. The point is that there are rich and varied ways stations for to use the Internet—which supplement your current operation, not replace it.

Will radio or TV become irrelevant in this brave new world? You might as well ask if the book will go away.

My friend Brewster Kahle invented a digital library system called WAIS that now consists of hundreds of different databases in a dozen countries. WAIS has a remarkable collection of information, ranging from the collected works of Shakespeare to the text of the Koran to collections of satellite photos showing the weather.

Do you know what Brewster values the most? His old printing press and his antique books. The question to him is not the book versus the computer, it is literacy versus illiteracy. Likewise, it is not my cyber station versus your radio station: it is us versus *Married with Children* and *Roseanne*. The important thing is not the particular format, it is the information, its presentation, the format and the aesthetics. It is not the book and radio that are the enemies, it is illiteracy. ■